

Remarks

Claims 1-14 and 20 are in the application, of which claims 1 and 20 are in independent form. There is no amendment to a claim pending in this application; therefore, this paper contains no claim listing.

In the specification, the title has been amended to more accurately describe the invention.

First, in the August 18, 2004 Office action, the Examiner provisionally rejected claims 1-14 and 20 “under the judicially created doctrine of [obviousness-type] double patenting over claims 13-17 and 63 of copending Application No. 10/265,500” (page 2). The Office action provides that “[a] timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application” (*id.*).

Applicants respond by providing a terminal disclaimer in compliance with 37 C.F.R. § 1.321(c) to overcome the Examiner’s rejection. The terminal disclaimer is signed by the inventors, William McKee Doane and Steven William Doane, who own the entire interest of both the present application and U.S. Patent Application No. 10/265,500, and the exclusive licensee, Absorbent Technologies, Inc., in compliance with 37 C.F.R. § 3.73(b). The submission of the terminal disclaimer overcomes the Examiner’s double patenting rejection of claims 1-14 and 20. Applicants request, therefore, that this double patenting rejection of claim 1, and its dependent claims 2-14, and claim 20 be withdrawn.

Claims 1-14 and 20 stand rejected under 35 U.S.C. § 102(b) for anticipation by U.S. Patent No. 4,134,863 to Fanta et al. (“Fanta”) (an inventor of the current application, William M. Doane, is a co-inventor of Fanta). Specifically, in the Office action, the Examiner states that “Fanta teaches a starch graft copolymer for use in agricultural applications and method of producing, the method comprising graft polymerizing grafting reagents onto starch to [form] a starch graft copolymer; saponifying the starch graft copolymer; precipitating the starch graft copolymer with ethanol; and granulizing [sic] (milling) the copolymer” (pages 3-4).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Applicants submit that Fanta does not describe all of the elements of each of independent claims 1 and 20.

First, independent claim 1 of the above-identified application recites “granularizing the precipitated starch graft copolymer to form particles of superabsorbent polymer product” (emphasis added). As stated in the present application, granularization of the superabsorbent polymer product is very important for agricultural applications because “[a]gricultural companies that market seed, fertilizer, herbicides, insecticides, and other agricultural materials have found little use for the [prior art] totally synthetic copolymer SAPs in agriculture because evaluations of these SAPs show poor performance because they are composed of small, fine particles having an 80 mesh size. One inherent limitation of finer-mesh particles is that they cannot be used in typical granule applicators which require particle sizes of at least 25 mesh. Further, the SAP films and powders cannot be applied with granular fertilizers, granular pesticides, or other granular agricultural additives” (paragraph [0004]).

Like the prior art totally synthetic copolymer SAPs, the absorbent composition described in Fanta is not granular; in fact, every example in Fanta describes an absorbent composition in the form of a film (*see* Examples 1-45 describing how “[t]he swollen rubbery solid was extracted first with ethanol and then with acetone and was finally spread onto a ‘Teflon’ tray and allowed to air dry” (column 8, lines 30-32)). The only time the word “granular” is used in Fanta is to describe the type of starch used to form the absorbent composition. Nowhere does Fanta describe a granular absorbent composition.

Second, independent claim 1 recites “[a] method of producing a superabsorbent polymer product for use in agricultural applications.” In contrast, Fanta does not describe or suggest the use of the absorbent composition described therein for agricultural purposes. Rather, Fanta states that the absorbent composition can be used “for the entrapment and immobilization of enzymes” (column 8, lines 2-3).

Dependent claims 2-14 stand rejected for anticipation. Applicants choose to rely on the arguments presented above with respect to independent claim 1 to support the patentability of the rejected dependent claims.

Because Fanta does not set forth each and every element of independent claims 1 and 20, Fanta does not anticipate these claims or their respective dependent claims. For these reasons, applicants believe that independent claims 1 and 20, together with their dependent claims, are not anticipated by Fanta. Applicants request, therefore, that the anticipation rejection of claims 1 and 20 and of their dependent claims 2-14 be withdrawn.

Claims 1-14 and 20 also stand rejected under 35 U.S.C. § 102(b) for anticipation by U.S. Patent No. 4,323,487 to Jones et al. (“Jones”). Specifically, in the Office action, the Examiner states that “Jones teaches a starch graft copolymer for use in agricultural applications (mixed with or coated on seeds and roots) and a method of making, the method comprising grafting polymerization of acrylonitrile onto starch; saponifying the starch graft copolymer; precipitating the saponified starch graft copolymer with methanol; and granulizing [sic] (making powder) the precipitated starch graft copolymer” (page 4).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Applicants submit that the Examiner is incorrect in her position that Jones describes all of the elements of each of independent claims 1 and 20. Applicants respond to the Examiner’s rejections as follows.

First, independent claim 1 of the above-identified application recites “granularizing the precipitated starch graft copolymer to form particles of superabsorbent polymer product” (emphasis added). As stated above, granularization of the superabsorbent polymer product is very important when the superabsorbent polymer product is to be used in agricultural applications. The focus of the present application is that prior art superabsorbent polymers were inadequate for use in agriculture, and the inventors of the present invention discovered a novel method of forming a superabsorbent product that can be used for agriculture. One important part of this method is granularizing the superabsorbent product.

In contrast, the absorbent polymer described in Jones is not granular. Jones states that “[t]he absorbent polymer can be made as film, flakes, powder or mat” (column 1, lines 44-45) and later describes the formation of a wet cake (*see* column 5, line 6 & Examples 2-4). In the Office action, the Examiner equates granularizing with “making powder” (page 4). However, as stated at paragraph [0004] of the present application, “[a]gricultural companies that market seed, fertilizer, herbicides, insecticides, and other agricultural materials have found little use for the [prior art] totally synthetic copolymer SAPs in agriculture because evaluations of these SAPs show poor performance because they are composed of small, fine particles having an 80 mesh size. One inherent limitation of finer-mesh particles is that they cannot be used in typical granule applicators which require particle sizes of at least 25 mesh. Further, the SAP films and powders cannot be applied with granular fertilizers, granular pesticides, or other granular agricultural additives” (emphasis added). Clearly, powders will show poor

performance when used for agriculture because they have small, fine particles having a size of 80 mesh or less and “[o]ne inherent limitation of finer-mesh particles is that they cannot be used in typical granule applicators which require particle sizes of at least 25 mesh” (paragraph [0004]). Thus the powder form of the absorbent polymer described in Jones is quite different than the granularized superabsorbent polymer described in the present application and cannot be used for the same purposes, specifically, in agriculture.

Further, Jones teaches away from the formation of a granular superabsorbent polymer product. Specifically, at column 2, lines 11-13, Jones states that “large granular material is not always feasible and even when it is, the improvement [in wet-out] is only partial.” The only other time the word “granular” is used in Jones is to describe the type of starch used to form the absorbent composition (*see* column 4, lines 11-13). At no point does Jones describe the formation of a granular absorbent polymer.

Second, independent claim 1 recites “[a] method of producing a superabsorbent polymer product for use in agricultural applications” (emphasis added). Actually, the superabsorbent polymer taught by Jones cannot be successfully used in agricultural applications. The Examiner quotes column 1, lines 53-59 of Jones, which lists substances with which the absorbent polymer of Jones ostensibly could be mixed, which list includes seeds and roots.

In response to the Examiner’s citation, applicants assert that the focus of Jones is that “it has been found that by reducing the hydration rate or the rate of product swelling of hydrolyzed starch polyacrylonitrile graft copolymer, significantly improved wicking or wet-out characteristics can be achieved. This can be accomplished by reacting the hydrolyzed starch polyacrylonitrile graft copolymer with a quantity of formaldehyde” (column 2, lines 33-42). The use of a formaldehyde cross-linker significantly reduces the absorbency of the superabsorbent polymer (column 3, lines 39 and 46-47). For example, Example 5 shows a reduction in absorbency to 37 times its weight in 1% sodium chloride solution as compared to the 68 times its weight in the absorbent polymer lacking formaldehyde as described in Example 2). Jones states that this decrease in absorbency is beneficial because the cross-linking reduces the gel-blocking tendency of very fine particles (column 3, lines 1-6, state that the superabsorbent polymer “exhibits extremely fast absorbency or hydration rates. In fact, the product swells so quickly that in an aqueous fluid with minimal agitation, the swollen gel-

like substance which forms on the surface of the dry absorbent polymer powder reduces or blocks further penetration of the aqueous fluid.”) Gel-blocking is primarily an issue when superabsorbent polymers are used in articles for use in absorbing bodily fluids, which appears to be the primary use of the superabsorbent polymer of Jones (note, for example, that each Example of Jones includes an analysis of wettability with a 1% sodium chloride solution, which mimics urine). More specifically, gel-blocking occurs when a powder superabsorbent polymer is rapidly wet by urine.

In contrast, with respect to the present application, gel-blocking does not occur when the superabsorbent polymer product recited in claims 1 and 20 is wet by water during the course of use “for agricultural applications.” Further, gel-blocking is not an issue with regard to the present application because the superabsorbent polymer of the present application is in the form of granules rather than in the form of a fine powder, as in Jones, and granules do not experience gel-blocking. Also, the present application expresses no desire to reduce the absorbency of the superabsorbent polymer product. Thus the teachings of Jones would be detrimental to the superabsorbent polymer product of the present application. For these reasons, the absorbent polymer described in Jones cannot be used for agricultural purposes and does not therefore fairly anticipate the “for use in agricultural applications” element of independent claim 1.

Dependent claims 2-14 stand rejected for anticipation. Applicants choose to rely on the arguments presented above with respect to independent claim 1 to support the patentability of the rejected dependent claims.

Independent claim 20 recites “[a] superabsorbent polymer product for use in agricultural applications made in accordance with the method of claim 1.” Thus the above arguments made with reference to independent claim 1 apply to independent claim 20.

Because neither Jones nor Fanta set forth each and every element of independent claims 1 and 20, applicants believe that neither reference anticipates these claims or their respective dependent claims. Applicants request, therefore, that the anticipation rejection of claims 1 and 20 and of their dependent claims 2-14 be withdrawn. Should a Declaration under Rule 1.131 be required, applicants invite the Examiner to contact applicant’s attorney, identified below, via telephone.

Applicants believe the application is in condition for allowance and respectfully request the same.

Respectfully submitted,

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